بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

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Ultrasound Guided Bilateral Superior Laryngeal Nerve Block Compared with Blind Block Technique for Awake Fibre-optic Intubation in Suspected Difficult Intubation

Thesis

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in **Anaesthesia, Intensive Care and Pain Management**

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Al Shaymaa Mortada Ali

List of Contents

List of Tables

List of Figures

List of Abbreviations

Abb.	Full term
ASA	*American Society of Anesthesiologists*
CNS	*Central Nervous System*
CPB	*Cardiopulmonary bypass*
DAS	*Difficult Airway Society*
ECG	*Electrocardiogram*
FOB	*Fibre-optic bronchoscope*
FOI	*Fibre-optic intubation*
GHH	*Greater horn of hyoid bone*
HR	*Heart rate*
ibSLN	*Internal branch of superior laryngeal nerve*
LAST	*Local anesthetic systemic toxicity*
MAP	*Mean arterial pressure*
NAP4	*4th National Audit Project*
NIBP	*Non-invasive blood pressure*
NRS	*Numerical rating scale*
PPS	*Pain perception score*
PABA	*Para-aminobenzoic acid*
SD	*Standard deviation*
SLA	*Superior laryngeal artery*
SLN	*Superior laryngeal nerve*
TM	*Thyro-hyoid membrane*
UK	*United Kingdom*
Vd	*Volume of distribution*
VL	*Videolaryngoscopy*

INTRODUCTION

Awake fibre-optic intubation is an established airway management technique in the management of the difficult airway. Psychological and pharmacological preparation of the patient plays a pivotal role in technical success of awake fibre-optic intubation ***(Ramkumar, 2011).***

Since awake intubation causes discomfort to patients, a variety of techniques have been described to achieve airway anesthesia, such as topical application of local anesthetics and injection of local anesthetic agents at specific anatomic landmarks to block the afferent neural transmission from the oropharynx and larynx ***(Ambi et al., 2017).***

The superior laryngeal nerve (SLN) has its origin from the vagus nerve and descends posterior to the carotid artery towards the larynx. At the level of hyoid bone, it divides into external and internal branches.

The internal branch provides sensory innervation of mucous membrane of the larynx above the level of vocal cords including base of the tongue and epiglottis. The internal branch passes immediately inferior to the greater horn of the hyoid bone and approaches the thyro-hyoid membrane. The external branch provides motor supply to crico-thyroid muscle ***(Kundra et al., 2011).***

In patients undergoing awake fibre-optic intubation, an internal branch of SLN block is frequently performed and is conventionally done by recognizing the greater horn of the hyoid bone and superior horn of the thyroid cartilage as anatomic landmarks ***(Furlan, 2002).***

Ultrasonographic imaging is a novel, portable, non-invasive tool encouraging anesthesia-related airway assessment and procedural interventions. To date, very few case reports are available assessing the usefulness of ultrasound over the conventional landmark-guided technique to block the SLN ***(Vázquez et al., 2009).***

Ultrasound imaging for nerve blocks is more likely to be successful, takes less time to perform, and has a faster onset, longer duration, and fewer complications (such as intravascular or intraneural injection) than the blind method. The same advantages may be possible with ultrasound-guided internal branch of superior laryngeal nerve (ibSLN) block ***(Manikandan et al., 2010).***

Both intubation and extubation can increase the concentration of catecholamines in the blood by stimulating the sympathetic nervous system, resulting in severe hemodynamic changes. However, during intubation, agents such as opioids and propofol can effectively inhibit airway stimulation by endotracheal tubes. During extubation, the withdrawal of anesthetics and the emergence of patients from anesthesia stimulate the sympathetic nervous system, increasing the

release of catecholamines and resulting in cough and hemodynamic responses, including hypertension and tachycardia. Although hemodynamic changes in laryngeal and tracheal tissues during this period are normally well tolerated by healthy individuals, they may be detrimental in hypertensive patients, leading to life-threatening complications such as myocardial ischemia, cardiac arrhythmias, and cerebrovascular hemorrhage , We describe the successful performance of ultrasound-guided bilateral superior laryngeal nerve block to facilitate awake fibre-optic intubation. ***(Jee, 2003)***.

AIM OF THE WORK

The aim of this study is to evaluate the effect of ultrasound guided technique for block of internal branch of superior laryngeal nerve in surgical patient in comparison to blind anatomical technique and its effect on hemodynamic changes .

ANATOMY OF SUPERIOR LARYNGEAL NERVE

The superior laryngeal nerve (SLN) originates commonly from the vagus nerve at the level of the C2 vertebra and descends medially toward the thyro-hyoid membrane (TM), the membrane between the thyroid cartilage and the hyoid bone. Its position was found to be mostly symmetrical between the right and left sides ***(Monfared, 2001).***

The SLN branch has internal and external branches deep to the internal carotid artery. The internal branch of the superior laryngeal nerve (ibSLN) passes immediately inferior to the greater horn of the hyoid bone, and approaches the TM accompanied by the superior laryngeal artery (SLA), a branch of the superior thyroid artery. Both the ibSLN and the SLA pierce the external surface of the TM ***(Gorti and Kim, 2002).***

IbSLN is divided into three branches. The superior branch of the ibSLN innervates the mucosa of the epi-glottis and a small part of the anterior wall of the vallecula. The middle branch is a sensory branch, which innervates the aryepiglottic folds. The inferior branch sends a few twigs to the inter-arytenoid muscle. The ibSLN is sensitive to the laryngeal mucosa down to the level of the vocal folds. It also carries